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NATIONAL RECOVERY ADMINISTRATION

DIVISION OF REVIEW

EVIDENCE STUDY

NO. 36

OF

THE RUBBER TIRE MANUFACTURING INDUSTRY

Prepared by

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PRELIMINARY DRAFT

(NOT FOR RELEASE: FOR USE IN DIVISION ONLY)

THE EVIDENCE STUDY SERIES

The EVIDENCE STUDIES were originally planned as a means of gathering evidence bearing upon various legal issues which arose under the National Industrial Recovery Act.

These studies have value quite aside from the use for which they were originally intended. Accordingly, they are now made available for confidential use within the Division of Review, and for inclusion in Code Histories.

The full list of the Evidence Studies is as follows:

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|-------------------------------------|---|
| 1. Automobile Manufacturing Ind. | 23. Mason Contractors Industry |
| 2. Boot and Shoe Mfg. Ind. | 24. Men's Clothing Industry |
| 3. Bottled Soft Drink Ind. | 25. Motion Picture Industry |
| 4. Builders' Supplies Ind. | 26. Motor Bus Mfg. Industry (Dropped) |
| 5. Chemical Mfg. Ind. | 27. Needlework Ind. of Puerto Rico |
| 6. Cigar Mfg. Industry | 28. Painting & Paperhanging & Decorating |
| 7. Construction Industry | 29. Photo Engraving Industry |
| 8. Cotton Garment Industry | 30. Plumbing Contracting Industry |
| 9. Dress Mfg. Ind. | 31. Retail Food (See No. 42) |
| 10. Electrical Contracting Ind. | 32. Retail Lumber Industry |
| 11. Electrical Mfg. Ind. | 33. Retail Solid Fuel (Dropped) |
| 12. Fab. Metal Prod. Mfg., etc. | 34. Retail Trade Industry |
| 13. Fishery Industry | 35. Rubber Mfg. Ind. |
| 14. Furniture Mfg. Ind. | 36. Rubber Tire Mfg. Ind. |
| 15. General Contractors Ind. | 37. Silk Textile Ind. |
| 16. Graphic Arts Ind. | 38. Structural Clay Products Ind. |
| 17. Gray Iron Foundry Ind. | 39. Throwing Industry |
| 18. Hosiery Ind. | 40. Trucking Industry |
| 19. Infant's & Children's Wear Ind. | 41. Waste Materials Ind. |
| 20. Iron and Steel Ind. | 42. Wholesale & Retail Food Ind. (See No. 31) |
| 21. Leather | 43. Wholesale Fresh Fruit & Veg. |
| 22. Lumber & Timber Prod. Ind. | |

In addition to the studies brought to completion, certain materials have been assembled for other industries. These MATERIALS are included in the series and are also made available for confidential use within the Division of Review and for inclusion in Code Histories, as follows:

- | | |
|------------------------------------|---|
| 44. Wool Textile Industry | 49. Household Goods & Storage, etc. (Dropped) |
| 45. Automotive Parts & Equip. Ind. | 50. Motor Vehicle Retailing Trade Ind. |
| 46. Baking Industry | 51. Retail Tire & Battery Trade Ind. |
| 47. Canning Industry | 52. Ship & Boat Bldg. & Repairing Ind. |
| 48. Coat and Suit Ind. | 53. Wholesaling or Distributing Trade |

L. C. Marshall
Director, Division of Review

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RUBBER TIRE MANUFACTURING INDUSTRY

Foreword

The chief sources of data used in this study are publications of the Bureau of the Census, the Bureau of Labor Statistics, the Bureau of Foreign and Domestic Commerce, and material especially prepared and submitted to the NRA by the Rubber Manufacturers' Association and the India Tire and Rubber Review.

There is no problem of comparability of Census and Code classifications; the Rubber Tire Manufacturing Industry as defined by the Code is practically co-extensive with the Rubber Tire and Inner Tube Industry as covered by the reports of the Census of Manufactures. The usual limitation of the Census data arising from the exclusion of establishments having an annual production of less than \$5,000 is considered not to be significant because there are presumably no establishments in the Industry which do not have an annual production of more than \$5,000.

Two sections of the outline have not been covered because of lack of pertinent information: the sections on trade practices and on general information. On the other hand, some topics have been expanded beyond the requirements of the Outline; the subject of exports, for instance, has been treated in detail because of the importance of particular aspects of the situation in this Industry.

Chapter I

THE NATURE OF THE INDUSTRY 1/

Definitions of the Industry

The Rubber Tire Manufacturing Industry is defined by the Code to mean:

" the manufacture for sale in the continental United States (including Alaska) and sale at wholesale by manufacturers or subsidiaries or affiliates of the same of solid or pneumatic rubber tires and/or pneumatic rubber tubes, together with such related branches or divisions as may from time to time be included under the provisions of this Code by the President, after such notice and hearing as he may prescribe."

The principal products of the Industry are solid or pneumatic rubber tires and/or pneumatic inner tubes for automobiles, trucks, buses, motorcycles, bicycles, aeroplanes, farm implements, graders, and tractors.

The by-products of the Industry are tire accessories and repair materials, tire patches (made usually from used tires and/or tubes), and tire retreading materials.

The Census classification for the "Rubber Tire and Inner Tube" Industry is defined to embrace

"..... those establishments which are engaged primarily in the manufacture of pneumatic tires, inner tubes, and solid and cushion rubber tires, for any class of vehicles."

It may thus be seen that the two classifications are comparable in a general way, and Census data can confidently be used to describe the codified Industry. The fact that the Census of Manufactures reports do not cover establishments having an annual production of less than \$5,000 is not significant in this Industry because there are presumably no establishments falling in this group.

Description of Operations

The following quotation describes the operations of the Industry:

"Tire making, in spite of much progress, continues to require a considerable amount of skilled labor. The availability of skilled workers in Akron explains in a large measure the early concentration of rubber companies in that city. The same explanation applies to Los Angeles at a somewhat later date. The first process in practically all rubber manufacture is mixing rubber with a chemical compound containing vulcanizers, usually sulphur or sulphur compounds, anti-oxidants, pigments and fillers, accelerators, or semi-catalysts. This is done by running rubber through heated rollers which tear the rubber apart and grind in the chemicals.

1/ See Appendix, Exhibit A, for table giving Statistical Summary of the Industry, 1921, 1929, 1931, and 1933.

"Tire building is largely an operation in which theplies, braker strip, cushion, tread and wall, and bead are assembled. For the large-sized tires, assembly is made on a core where the worker shapes the tire in process in order to reduce strain in final shaping and vulcanization. The smaller sizes, on which production is in large volume, are built on drums and the tire is shaped in a vacuum machine. The United States Rubber Company in 1930 put into operation what was claimed to be the first continuous assembly line for tires. Each man performs only one operation, so that the training period required for normal production speed is a matter of only a few hours, as compared with about two months for other methods. In addition, production per man is said to be increased about 50 per cent. After assembly of the various components making up the tire, it is placed in a heavy mold, which forms the outer surface design and lettering, and is subjected to pressure from an inner tube containing hot water or air. The molds are placed in heaters where vulcanization of the assembled parts into a strong unit takes place. Vulcanization also gives the tire wearing quality.

"Inner tubes are made by one process by forming rubber into an endless, seamless tube, which is cut into proper lengths, the ends joined and sealed together by vulcanization, which at the same time gives strength and long life to the tubes. Under another process, tubes are made by winding strips of rubber around rods, which are placed in heated tanks for vulcanization. In this way, traces of seams are eliminated. The tubes are later spliced and vulcanized. The latter method, while apparently more costly, is understood to produce very few rejections. The former process is said to have as high as 10 per cent rejections."1/

Total Number of Establishments

According to Census data, the number of establishments declined from 91 in 1929 to 44 2/ in 1933, a decrease of 47 establishments, or 51.7 per cent.

Decline in Number of Establishments

An interesting comment on the decrease in the number of tire manufacturing establishments is found in the "Rubber Industry Letter No. 7," published by the Bureau of Foreign and Domestic Commerce, September 6, 1933, which reads as follows:

"The number of plants principally engaged in the manufacture of tires has declined continuously from 178 in 1921 to only 48 in 1931, when in several instances a single corporation controlled two or more tire plants. The rate of mortality has been extremely high in the tire manufacturing industry; in view of the unprofitable operations of this industry from 1927 to 1930, inclusive, it is not surprising that mortality was more accentuated from 1927 to 1931 than from 1921 to 1927. A recent tire company advertisement states that since 1912, 537 tire companies have started in business, of which only 32 now remain."

1/ Frazier and Doriot, Analyzing Our Industries, p. 102.

2/ Due presumably to the difference in sources, this figure is not identical with that given in Table II, below.

10. The Commission has also received information from the Government of the Republic of the Congo that the Government has been providing military training to the armed forces of the Republic of the Congo, which is a member of the Organization of African Unity (OAU).

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Number and Size of Concerns

The tire manufacturing concerns divide themselves into two general classes, namely, the "Big Four" and 28 others.

The Big Four include the following companies: Goodyear, Firestone, United States, and Goodrich. These companies are called the Big Four because they control about 65 per cent of the total productive capacity of the Industry and could supply the entire domestic market. 1/

The remaining 28 companies represent only 35 per cent of the productive capacity, and, of these, there are 15 which have capacities of less than one per cent of the whole Industry.

The Fisk and General companies are sometimes classed with the Big Four -- Fisk because of its capacity of 9 per cent of the total and General because of its profitable record.

Table I shows the individual tire manufacturing companies comprising the Industry, listed in the order of their importance based on their productive capacity in 1933 as estimated by the India Tire and Rubber Review.

1/ From brief prepared by the India Tire and Rubber Review and submitted to the NRA in 1933.

TABLE I

Estimated Daily Capacity of Individual Companies, 1933 a/
(In Tire Units)

Company	Capacity <u>b/</u>	Per Cent of Total
Goodyear Tire and Rubber Company	90,000	26.42
Firestone Tire and Rubber Company	46,500	13.65
United States Rubber Company	42,000	12.33
The B. F. Goodrich Company	41,000	12.04
Fisk Rubber Corporation	31,000	9.10
Kelly-Springfield Tire Company	12,000	3.52
Mansfield Tire and Rubber Company	9,500	2.79
General Tire and Rubber Company	9,000	2.64
Seiberling Rubber Company	6,000	1.76
Pharis Tire and Rubber Company	5,500	1.62
Gates Rubber Company	5,000	1.47
Lee Rubber Tire Company	5,000	1.47
Murray Rubber Company	5,000	1.47
Dayton Rubber Manufacturing Company	4,500	1.32
Dunlop Tire and Rubber Corporation	4,500	1.32
Pennsylvania Rubber Company	4,000	1.17
Master Tire and Rubber Company <u>c/</u>	3,500	1.04
Hohawak Rubber Company	2,500	0.73
India Tire Company	2,500	0.73
Corduroy Tire Corporation	2,000	0.59
Inland Rubber Company	2,000	0.59
Denman Tire and Rubber Company	1,500	0.43
McClaren Rubber Company	1,000	0.29
Monarch Rubber Company	1,000	0.29
Norwalk Tire and Rubber Company	1,000	0.29
Armstrong Rubber Company	500	0.15
Hamilton Rubber Manufacturing Company	500	0.15
Lakeshore Tire and Rubber Company	500	0.15
F. G. Schenuit Rubber Company	500	0.15
Standard Four Tire Company	500	0.15
McCreary Tire and Rubber Company	300	0.09
Overman Cushion Tire Company	200	0.09
Total estimated daily capacity	340,600	100.00

Source: Brief submitted to NRA by India Tire and Rubber Review, 1933.

a/ Coast Tire Company not included in this estimate.

b/ Capacities of subsidiaries of Goodyear, Firestone, U. S., and Goodrich are included with parent companies.

c/ The capacity listed for this company is the combined capacity of its three subsidiaries, Fall Rubber Company, Cooper Corporation, and Giant Tire and Rubber Company.

Location of Factories by States

The national character of the Tire Manufacturing Industry is indicated by the fact that tire factories are situated in sixteen states. It will be noted from Table II that fifteen of the forty-two establishments are located in Ohio, five in California, and three in Pennsylvania. The remaining states had not more than two each: there were six states with two, and seven with one factory each.

TABLE II

Location of Factories, by States, 1933 a/

State	Number of Factories
Alabama	1
California	5
Colorado	1
Connecticut	2
Illinois	1
Indiana	1
Iowa	2
Maryland	2
Massachusetts	1
Michigan	2
New Jersey	2
New York	2
North Carolina	1
Ohio	15
Pennsylvania	3
Wisconsin	1
Total	42

Source: Brief submitted to NRA by India Tire and Rubber Review, 1933.

a/ In cases where a company operates more than one plant in a given locality, these plants have been counted as one factory.

The detailed data upon which Table II is based are presented in Table III, which shows the individual tire companies by name and the location of their plants by city and state. It will be noted that plants of the Big Four are situated in several states. For example, the Goodyear Company has plants in Alabama, California, and Ohio; Firestone and Goodrich have plants in California and Ohio; and the United States Rubber Company has plants in California, Indiana, and Michigan.

TABLE III

Location of Plants of Individual Concerns,
by City and State,
1933.

State and Company	City Where Plant is Located
<u>Alabama</u>	
Goodyear Tire and Rubber Company	Gadsden
<u>California</u>	
Coast Tire Company	Oakland
Firestone Tire and Rubber Company	Los Angeles
Goodrich Rubber Company	Los Angeles
Goodyear Tire and Rubber Company	Los Angeles
Sampson Tire and Rubber Company (Subsidiary of U. S. Rubber Company)	Los Angeles
<u>Colorado</u>	
Gates Rubber Company	Denver
<u>Connecticut</u>	
Armstrong Rubber Company	West Haven
Norwalk Tire and Rubber Company	Norwalk
<u>Illinois</u>	
Inland Rubber Company	Chicago
<u>Indiana</u>	
G. and J. Tire Company (U. S. Rubber Company)	Indianapolis
<u>Iowa</u>	
Standard Four Tire Company	Keokuk
Lake Shore Tire and Rubber Company	Des Moines
<u>Maryland</u>	
Kelly-Springfield Tire and Rubber Company	Cumberland
Schemuit Rubber Company	Baltimore
<u>Massachusetts</u>	
Fisk Tire Company	Chicopee Falls
<u>Michigan</u>	
Corduroy Rubber Company	Grand Rapids
U. S. Rubber Company	Detroit
<u>New Jersey</u>	
Hamilton Rubber Manufacturing Company	Trenton
Murray Rubber Company	Trenton
<u>New York</u>	
Dunlop Tire and Rubber Company	Buffalo
Overman Cushion Tire Company	New York City
<u>North Carolina</u>	
McClaren Rubber Company	Charlotte
<u>Ohio</u>	
Cooper Corporation (Master Tire and Rubber Company)	Cuyahoga Falls
Dayton Tire and Rubber Company	Dayton
Denman Tire and Rubber Company	Massillon
Falls Rubber Company (Master Tire and Rubber Company)	Cuyhoga Falls

(Continued on next page)

TABLE III (Cont'd)

State and Company	City Where Plant is Located
<u>Ohio (Cont'd)</u>	
Firestone Tire and Rubber Company	Akron
General Tire and Rubber Company	Akron
Giant Tire and Rubber Company	Findlay
(Master Tire and Rubber Company)	
Goodrich Rubber Company	Akron
Goodyear Tire and Rubber Company	Akron
India Tire and Rubber Company	Akron
Mansfield Tire and Rubber Company	Mansfield
Mohawk Rubber Company	Akron
Monarch Rubber Company	Hartsville
Pharis Tire and Rubber Company	Newark
Seiberling Rubber Company	Akron
<u>Pennsylvania</u>	
Pennsylvania Rubber Company	Joannette
Lee Tire and Rubber Company	Conshohocken
McCreary Tire and Rubber Company	Indiana
<u>Wisconsin</u>	
Gillette Rubber Company	Gillette
(United States Rubber Company)	

Source: Brief submitted to NRA by India Tire and Rubber Review, 1933.

Capital Invested

In 1929, the capital invested in the Tire Manufacturing Industry was estimated by the Rubber Manufacturers' Association to have been \$556,000,000. In 1933, the same Association estimated the capital at \$419,000,000, a decrease of \$137,000,000, or 24.6 per cent, compared with that of 1929.

Table V shows the estimated capital during each of the years from 1929 through 1933.

TABLE IV
Estimated Capital Investment, 1929-1933

Year	Estimated Capital
1929	\$556,000,000
1930	545,000,000
1931	490,000,000
1932	425,000,000
1933	419,000,000

Source: Rubber Manufacturers' Association,
Brief submitted to NRA, 1933.

The capital invested in the Tire Manufacturing Industry is difficult to estimate because practically all of the members of the Industry engage in the manufacture of other rubber products. Because the manufacturing operations of almost all rubber products are the same in the early stages, and inasmuch as the manufacturers do not find it feasible to keep separate books of account, the proportion of the total invested capital ascribable to the manufacture of tires alone is not definitely known.

Financial Condition

The Rubber Manufacturers' Association has submitted two consolidated balance sheets for the years 1929 through 1932 -- one for the Big Four, and another for six smaller companies whose identities were not disclosed.

The consolidated balance sheet for the Big Four is shown in Table V-A. It will be seen that in 1929 these companies had total assets of \$865,854,000 and net profits of \$30,740,000. By 1932 their total assets had shrunk to \$600,526,000, a decrease of \$265,328,000, or nearly 31 per cent. In the three years of 1930, 1931, and 1932, the Big Four incurred a total net deficit of \$64,664,000.

The consolidated balance sheet for six smaller companies, presented as Table V-B, shows that their total assets in 1929 amounted to \$71,444,000 and that they had declined by 1932 to \$45,372,000, a decrease of \$26,072,000, or slightly over 36 per cent. For the three-year period, 1930-1932, a combined net deficit of \$9,911,000 was reported.

TABLE V-A

Consolidated Balance Sheets and Ratios, "Big Four" Companies, 1929-1932
(Firestone, Goodrich, Goodyear, and United States)
(Money figures expressed in thousands)

Item	1929	1930	1931	1932
<u>Assets</u>				
Cash	\$98,966	\$72,331	\$82,294	\$92,244
Receivables	117,096	102,461	76,317	57,223
Merchandise Inventories	211,125	165,670	126,919	100,270
Total Current Assets	427,187	340,462	285,530	249,737
Fixed Assets	428,077	386,769	369,237	342,364
Deferred Charges	10,590	9,327	9,813	8,425
Total Non-Current Assets	438,667	396,096	379,050	350,789
Grand Total	865,854	736,558	664,580	600,526
<u>Liabilities and Net Worth</u>				
Current Debt	92,622	37,639	28,342	32,652
Funded Debt	205,248	241,272	224,666	191,366
Total Debt	297,870	278,911	233,008	224,018
Capital Stock	405,259	348,209	344,438	334,481
Surplus and Reserves	162,725	109,438	67,134	42,027
Net Worth	567,984	457,647	411,572	376,503
Grand Total	865,854	736,558	664,580	600,526
Net Sales	758,270	636,416	502,294 <u>a/</u>	346,191
Net Profit (or Loss)	30,740	-27,466	-21,616	-15,582
Return on Net Worth	6.8%	-4.8%	-4.7%	-5.8%
Return on Sales	4.1%	-4.3%	-4.3%	-4.5%
<u>Ratios</u>				
Current Ratio	461%	904%	1007%	765%
Merchandise to Receivables	190	162	166	175
Net Worth to Non-Current	130	116	109	107
Sales to Receivables	648	620	658	605
Sales to Merchandise	360	384	396	345
Sales to Net Worth	134	139	122	92
Worth to Total Debt	191	164	163	163
Sales to Fixed Assets	177	165	136	101
Total Ratio Index	343%	444%	475%	396%

Source: Rubber Manufacturers' Association, submitted to NRA, April, 1935.

a/ Exclusive of \$12,000,000 sales of U. S. subsidiaries not consolidated.

TABLE V-B

Consolidated Balance Sheets and Ratios, Six Smaller Companies, 1929-1932
(Money figures expressed in thousands)

Item	1929	1930	1931	1932
<u>Assets</u>				
Cash	\$4,834	\$3,643	\$4,798	\$2,742
Receivables	14,560	12,904	11,705	12,150
Merchandise Inventories	19,334	15,988	9,914	7,560
Total Current Assets	38,728	30,535	26,417	22,452
Fixed Assets	31,712	32,905	31,478	22,623
Deferred Charges	1,004	441	491	297
Total Non-Current Assets	32,716	33,346	31,969	22,920
Grand Total	71,444	63,881	58,386	45,372
<u>Liabilities and Net Worth</u>				
Current Debt	10,160	6,141	4,369	2,816
Funded Debt	623	4,361	4,928	6,854
Total Debt	10,783	10,502	9,297	9,670
Capital Stock	53,266	53,196	52,919	29,472
Surplus and Reserves	7,395	183	-3,830	6,230
Net Worth	60,661	53,379	49,089	35,702
Grand Total	71,444	63,881	58,386	45,372
Net Sales	87,350	69,190	55,816	44,890
Net Profit (or Loss)	458	-5,890	-2,335	-1,686
Return on Net Worth	.7%	-9.7%	-4.4%	-5.4%
Return on Net Sales	.5%	-8.5%	-4.2%	-3.8%
<u>Ratios</u>				
Current Ratio	381%	497%	605%	797%
Merchandise to Receivables	133	108	85	62
Net Worth to Non-Current	185	160	153	156
Sales to Receivables	600	536	477	369
Sales to Merchandise	452	495	563	594
Sales to Net Worth	144	130	113	126
Worth to Total Debt	563	508	530	369
Sales to Fixed Assets	275	210	176	198
Total Ratio Index	412%	419%	447%	452%

Source: Rubber Manufacturers' Association, submitted to NRA, April, 1935.

Number of Failures

From 1929 through 1933 there were 26 failures among the manufacturers in this Industry. The total amount of liabilities involved was \$4,620,779. In 1934, the year of Code operation, there were no failures. It is, however, problematical whether this showing is the result of generally improved conditions or of the effect of the Code. 1/

The six-year period, 1929 through 1934, represented a decided improvement over the four-year period, 1925 through 1928, when there were 46 failures with liabilities totaling \$9,984,887.

Table VI shows the number of failures and the amount of liabilities involved for each year from 1925 through 1934, as follows:

TABLE VI
Number of Failures and Amount of Liabilities,
1925-1934

Year	Number	Amount of Liabilities
1925	12	\$5,162,200
1926	8	1,132,600
1927	12	1,080,124
1928	14	4,609,963
1929	7	1,131,000
1930	5	465,200
1931	9	1,219,938
1932	3	25,400
1933	2	1,779,241
1934	none	none

Source: Dun and Bradstreet, Special Tabulation for
NRA, Research and Planning Division.

1/ See NRA, Research and Planning Division, Code Administration Report, "Rubber Manufacturing Industry," by W. H. Cross (March, 1935) p. 6.

Total Value of Production

The total value of the Industry's products declined from \$770,177,000 in 1929 to \$299,313,000 in 1933, a decrease of \$470,864,000, or about 60 per cent. (See Table VII.) However, compared with the peak year of 1925, the decrease in value amounted to \$625,689,000. This decrease in value is due not only to the decrease in volume but also to the price policies of the Industry. 1/

1/ See NRA, Research and Planning Division, "Material Bearing on the Rubber Tire Industry," by A. L. Kress (November 9, 1933), p. 6.

TABLE VII
Annual Value of Production for Selected Years,
1921-1933 a/

Year	Amount (In thousands)
1921	\$496,123
1923	644,194
1925	925,002
1927	869,688
1929	770,177
1931	406,283
1933	299,313

Source: Census of Manufactures, 1929 and 1933,
"Rubber Products," Rubber Tire and
Inner Tube Industry.

a/ The data are for the entire production
of tire plants, including therefore some
secondary products.

Total Volume of Production

The total volume of production of pneumatic casings declined from 69,765,000 casings in 1929 to 45,376,000 in 1933, a decrease of 24,389,000 casings, or 34.9 per cent. (See Table VIII.) The 1934 production is estimated at 47,171,000 casings, representing a slight gain over the 1933 production. The low point in production occurred in 1932 when only 40,085,000 casings are estimated to have been produced.

TABLE VIII
Annual Production of Casings,
for Selected Years, 1925-1934

Year	Number (In thousands)
1925	58,784
1927	63,550
1929	69,765
1931	49,143
1932	40,085 <u>a/</u>
1933	45,376
1934	47,171 <u>a/</u>

Source: Census of Manufactures, 1929, and 1933, "Rubber Products,"
Rubber Tire and Inner Tube Industry, except as otherwise indicated.

a/ Estimated by NRA, Research and Planning Division.

Principal Cause of Decline in Volume

The principal cause of the decline in volume is stated to be the increasing life of tires. All of the tire manufacturers maintain a staff of research chemists who are constantly striving to improve the quality of the tires produced. The result of their efforts is seen in the constantly increasing mileage given by tires. Table IX shows how mileage has increased since 1914.

TABLE IX

Average Mileage of Tires, for
Selected Years - 1914-1933.

Year	Average Mileage
1914	3,500
1922	8,000
1930	15,000
1933	20,000

Source: Rubber Manufacturers' Association,
Brief submitted to NRA, 1933.

The Rubber Manufacturers' Association, in its brief (1933), stated that:

"...the present day tire will on the average afford approximately 20,000 miles and when carefully supervised as to inflation, proper mounting and proper loads, frequently affords as high as 50,000 miles and often as high as 65,000 to 75,000 miles."

Mr. Boris Stern, of the Department of Labor, in his study,
Labor Productivity in the Automobile Tire Industry, 1/ stated that:

".... constant improvement in the quality of tires may result eventually in the manufacture of tires that will last as long as the average automobile. In that case, the largest source of the present demand for tires will be automatically eliminated and tire manufacturing will be reduced to a comparatively minor part of the automobile industry."

1/ Bureau of Labor Statistics, Labor Productivity in the Automobile Tire Industry, by Boris Stern. (Bulletin No. 585, July, 1933).



Chapter II

LABOR STATISTICS 1/

Total Number of Employees

Employment decreased from 83,260 wage earners in 1929 to 52,960 wage earners in 1933, a decrease of 30,300 wage earners, or 36 per cent, as shown in Table X, below. However, the low point in employment occurred in 1932 when only 44,710 wage earners were employed, representing a decrease of 38,550 wage earners, or 46 per cent, compared with 1929.

Employment for the years 1929 through 1934 is shown in the following table:

TABLE X

Annual Employment, 1929-1934

Year	Employment	
	Number	Index (1929=100)
1929	83,260	100.0
1930	59,760	71.8
1931	49,130	59.0
1932	44,710	53.7
1933	52,960	63.6
1934	62,150	74.6

Source: Index as published by Bureau of Labor Statistics for "Rubber Tires and Tubes" in Trend of Employment; shifted to 1929 base, adjusted to 1933 Census totals, and multiplied by Census base by NRA, Research and Planning Division.

Employment and Wages by States

Table XI shows employment and wages by principal states for 1929, 1931, and 1933. It will be noted that detailed breakdowns are not available for 1931 and 1933, but that in each year Ohio accounted for around 65 per cent of both total employment and total wages.

1/ See Appendix, Exhibit A, for table giving Statistical Summary of the Industry, 1921, 1929, 1931, and 1933.

TABLE XI

Employment and Wages, by Principal States

State	1929		1931		1933	
	Employment	Wages (000's)	Employment	Wages (000's)	Employment	Wages (000's)
California	5,339	\$8,172	3,756	\$4,931	3,145	\$3,118
Iowa	193	191	-- a/	-- a/	-- a/	-- a/
New Jersey	2,000	2,641	-- a/	-- a/	-- a/	-- a/
Ohio	55,307	88,165	32,180	41,933	35,621	37,888
Pennsylvania	1,637	1,926	-- a/	-- a/	-- a/	-- a/
Wisconsin	3,922	5,236	-- a/	-- a/	-- a/	-- a/
All others	14,865	20,751	13,223	16,225	14,210	13,731
Total	83,263	127,082	49,159	63,089	52,976	54,737

Source: Census of Manufactures, 1929 and 1933, "Rubber Products," Rubber Tire and Inner Tube Industry.

a/ Included in "All Others."

Seasonality of Employment

The unsettled conditions within the Industry have not only greatly accentuated the seasonality of employment, but have also resulted in varying seasons of peak employment. For example, in 1929 employment increased in the early months of the year, reaching a peak in May. On the other hand, in 1933 employment did not increase until later in the year, reaching a peak in August. The year 1934, however, was more like 1929, with employment reaching its peak in May.

Table XII, which follows, shows employment by months for the years 1929, 1933, and 1934, with an index based on the average monthly employment for each year. This table shows that in 1929 monthly employment varied from 63,110 wage earners in December, to 92,010 wage earners in May, a difference of 28,900 wage earners, or about 47 per cent. In 1933 employment varied from 41,960 wage earners in January and April to 64,110 wage earners in August, a difference of 22,150 wage earners, or slightly more than 50 per cent. In 1934, employment was more nearly uniform, with a difference of about 20 per cent between peak and low point. The peak was reached in May, with 68,280 employed wage earners, and the low point was reached in November, with 56,790 employed wage earners, a difference of 11,490 employed wage earners.



TABLE XII

Monthly Employment

(Index Based on Average Monthly Employment for Entire Year)

Month	1929		1933		1934	
	Number	Index	Number	Index	Number	Index
January	86,840	104.3	41,960	79.2	59,030	95.0
February	87,840	105.5	42,960	81.1	61,530	99.0
March	89,340	107.3	41,760	78.9	64,450	103.7
April	90,590	108.8	41,960	79.2	67,780	109.1
May	92,010	110.5	46,290	87.4	68,280	109.8
June	91,260	109.6	53,210	100.5	68,190	109.7
July	89,510	107.5	59,950	113.2	63,950	102.9
August	85,680	102.9	64,110	121.0	61,030	98.2
September	81,680	98.1	62,860	118.7	58,120	93.5
October	75,850	91.1	61,530	116.2	57,280	92.2
November	65,440	78.6	59,780	112.9	56,790	91.4
December	63,110	75.3	59,280	111.9	59,370	95.5
Average	83,260	100.0	52,960	100.0	62,150	100.0

Source: Index as published by Bureau of Labor Statistics for "Rubber Tires and Tubes" in Trend of Employment; base shifted, adjusted to 1933 Census totals, and multiplied by Census base by NRA, Research and Planning Division.

Total Annual Wages, and Per Cent which Wages are of Total Value of Product

Table XIII shows that total annual wages decreased from \$127,082,000 in 1929 to \$54,737,000 in 1933, a decrease of \$72,345,000, or 57 per cent. This decrease in wages, however, was slightly less than the decrease in value of products, which, during the same period, decreased 61 per cent. Wages, therefore, during the depression increased in per cent of value of products from 16.5 per cent to 18.3 per cent.

TABLE XIII

Total Annual Wages and Wages as Per Cent of Total Value of Product
(In thousands)

Year	Total Value of Product	Total Wages	Wages as Per Cent of Total Value of Product
1929	\$770,177	\$127,082	16.5
1931	406,283	63,089	15.5
1933	299,313	54,737	18.3

Source: Census of Manufactures, 1933, "Rubber Products," Rubber
Tire and Inner Tube Industry.

Index of Payrolls

The index of payrolls declined from 100.0 in 1929 to 35.6 in 1932, the low point of the depression for the Tire Manufacturing Industry. In 1933 the index rose to 43.1 and in 1934 it further increased to 59.1. Table XIV shows the index from 1929 through 1934.

TABLE XIV

Index of Payrolls, 1929-1934
(1929=100)

Year	Index
1929	100.0
1930	70.0
1931	49.6
1932	35.6
1933	43.1
1934	59.1

Source: Index as published
by Bureau of Labor
Statistics for "Rub-
ber Tires and Tubes"
in Trend of Employment;
shifted to 1929 base
and adjusted to 1933
Census totals by NRA,
Research and Planning
Division.

Average Hourly Wages

The Rubber Tire Manufacturing Industry has always paid higher wages than manufacturing industry in general. ^{1/} Even during the depression,

^{1/} See NRA, Research and Planning Division, "Material Bearing on the Rubber
Tire Industry," by A. L. Kress (November 9, 1933), p. 9.



hourly wage rates were for the most part maintained. This is shown in Table XV, which gives hourly wage rates, by years, from 1929 through 1934. In the depth of the depression average hourly wages were only 8.6 per cent below the wages of 1929. Since 1932 wage rates have steadily risen and in 1934 were higher than even the 1929 level.

TABLE XV

Average Hourly Wage Rates, 1929-1934

Year	Average Hourly Wage	
	Amount (Cents)	Index (1929=100.0)
1929	67.7	100.0
1930	68.0	100.4
1931	67.3	99.4
1932	61.9	91.4
1933	63.2	93.3
1934	77.6	114.6

Source: From 1932 to date, basic data from Bureau of Labor Statistics data for "Rubber Tires and Inner Tubes," as published in Trend of Employment; for previous years from National Industrial Conference Board, Service Letter, adjusted to Bureau of Labor Statistics series. Index computed by NRA, Research and Planning Division.

Average Annual Wage

Average annual wages received by rubber-tire workers have been, on the average, 15 per cent higher than the average wages received by workers in all manufacturing industry. This is illustrated by Table XVI.

TABLE XVI

Comparison of Annual Wages Paid by the Tire Manufacturing Industry and by All Manufacturing Industries, for Census Years, 1921-1933

Year	Annual Wages Paid		Per Cent Differential in Favor of Tire Manufacturing
	Tire Man- ufacturing	All Manufacturing Industry	
1921	\$1,350	\$1,180	14.5
1923	1,470	1,255	17.0
1925	1,475	1,280	15.0
1927	1,535	1,300	18.0
1929	1,530	1,315	16.0
1931	1,280	1,110	15.5
1933	1,035	869	19.0

Source: Basic data from Census of Manufactures for the years noted, "Rubber Products," Rubber Tire and Inner Tube Industry. Computed by NRA, Division of Research and Planning, by dividing total annual wages by average number of wage earners, both full and part-time.

The above data must be understood to indicate the average income received by all employees, both part and full-time workers. They indicate that employees in the tire industry averaged, during these years, wages which were 14.5 to 19 per cent higher than the wages received by workers in manufacturing industry in general.

Average Weekly Wage

As shown in Table XVII, the average weekly wage declined from \$29.95 in 1929 to \$20.22 in 1933, a decrease of \$9.73, or 32.5 per cent.

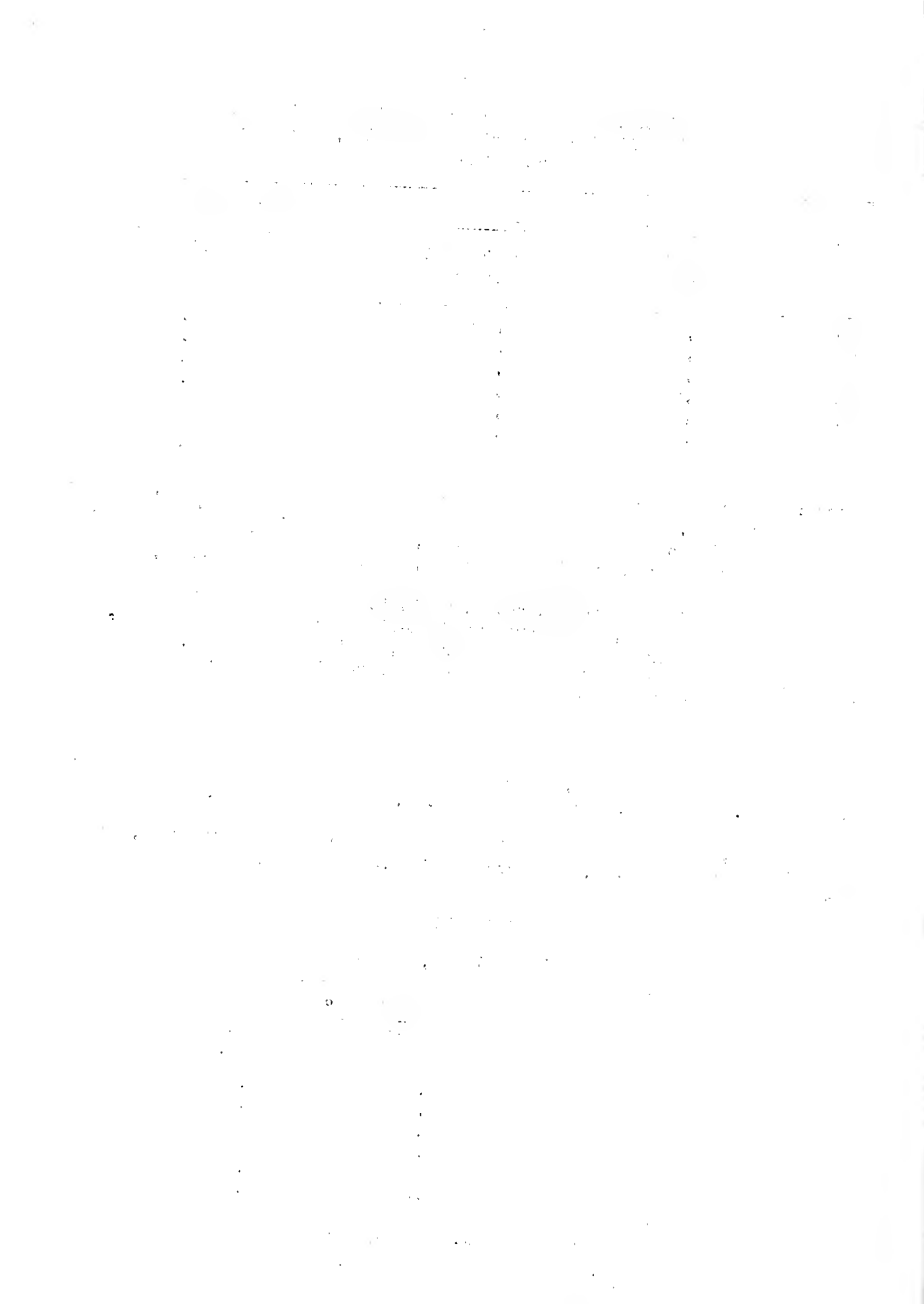
In 1934, as a result of the increase in the average hourly rate, weekly wages increased to \$23.58, an increase of \$3.36 per week, or 17 per cent over 1933.

TABLE XVII

Average Weekly Wages, 1929-1934

Year	Average Weekly Wage	
	Amount	Index (1929=100.0)
1929	\$29.95	100.0
1930	28.77	96.9
1931	25.55	86.8
1932	20.67	68.0
1933	20.22	58.6
1934	23.58	79.9

Source: Basic data as published by Bureau of Labor Statistics, for "Rubber Tires and Tubes" in Trend of Employment. Index computed by NRA, Research and Planning Division.



Estimated Average Weekly Payroll

Table XVIII shows the average weekly payrolls for the period 1929 through 1934. In 1929 the estimated average weekly payroll was \$2,444,000. (The highest average weekly payroll during any one month of 1929 was in May when weekly payrolls averaged \$2,859,000; the lowest was in December when weekly payrolls averaged \$1,716,000.) The low point in average weekly payrolls was in 1932 when the average for the year was only \$870,000, a decrease of \$1,574,000, or 64 per cent, compared with 1929.

Beginning in 1933, the estimated average weekly payroll showed increases and, in 1934, amounted to \$1,444,000, an increase of \$574,000, or 66 per cent, over the low estimated for 1932.

TABLE XVIII

Estimated Average Weekly Payroll, 1929-1934

Year	Average Weekly Payroll	
	Amount	Index (1929=100.0)
1929	\$2,444,000	100.0
1930	1,711,000	70.1
1931	1,212,000	50.3
1932	870,000	35.5
1933	1,053,000	43.1
1934	1,444,000	59.0

Source: Index as published by Bureau of Labor Statistics for "Rubber Tires and Tubes" in Trend of Employment; shifted to 1929 base, adjusted to 1933 Census totals, and multiplied by Census base by NRA, Research and Planning Division.

Average Weekly Hours

Table XIX shows the average weekly hours for the period, 1929 through 1934. Average weekly hours declined from 44.2 in 1929 to 31.7 in 1933, a decrease of 12.5 hours, or 28 per cent. In 1934 average weekly hours declined further to 30.7.

The decrease in weekly hours was the result of the policy of the Industry to "share the work." In 1932 the Industry -- especially those establishments located in Akron -- changed from an 8-hour shift to a 6-hour shift and from a six to a four or five-day week. By this means, the Industry managed to lessen for labor the hardships attendant upon the depression and the increased productivity of labor. Because of this policy, the Code provision limiting hours to 36 hours per week accomplished very little re-employment inasmuch as the Industry was already on a 30-hour week.

TABLE XIX

Average Weekly Hours, 1929-1934

Year	Average Hours Weekly	
	Number	Index (1929=100.0)
1929	44.2	100.0
1930	42.3	96.0
1931	37.9	85.6
1932	32.7	73.8
1933	31.7	71.8
1934	30.7	69.5

Source: From 1932 to date, basic data from Bureau of Labor Statistics data for "Rubber Tires and Inner Tubes," as published in Trend of Employment; for previous years from National Industrial Conference Board, Service Letter adjusted to Bureau of Labor Statistics series. Index computed by NRA, Research and Planning Division.

Productivity of Labor

The United States Department of Labor has made an excellent survey of productivity in the Tire Industry, based on studies in six plants which produced 60 per cent of the total output in 1931. 1/

This survey points out that in these six plants the 1931 production was greater by 21,400,000 tires than the 1921 production. This would have necessitated an increase of 35,500 employees, at the 1921 rate of man-hour output. Actually there was a net decrease of 7,150 employees, or a total of 42,650 direct labor employees technologically displaced. This condition has been characteristic of the entire Industry.

Table XX shows that the index of productivity of labor, based on the number of tires produced per man-hour, and, using the year 1926 as 100, increased from 76.34 in 1922 to 149.51 in 1931. In other words, during that decade the number of tires produced per man-hour increased almost 100 per cent.

Table XX also shows that the index of productivity of labor, measured by the pounds produced per man-hour, increased from 68.46 in 1922 to 186.08 in 1931, an increase of 172 per cent.

1/ Bureau of Labor Statistics, Labor Productivity in the Automobile Tire Industry, by Boris Stern (Bulletin No. 585, July, 1933), p.26.

TABLE XX

Index of Productivity of Labor, Six
Representative Plants, 1922-1931
(1926=100)

Year	Index	
	Output Per Man-Hour Tires	Pounds
1922	76.34	68.46
1923	85.17	74.50
1924	89.75	77.10
1925	86.80	83.55
1926	100.00	100.00
1927	107.20	114.17
1928	113.96	127.20
1929	117.12	138.32
1930	124.43	158.75
1931	149.51	186.08

Source: Bureau of Labor Statistics, Labor Productivity in the Automobile Tire Industry, by Boris Stern (Bulletin No. 535, July, 1933), p. 7.

Causes of Technological Displacement of Labor

It is seldom possible to segregate any one factor as "the cause" of the increased productivity of labor in a manufacturing plant. In some cases major changes -- such as, for instance, the invention of the Owens bottle-blowing machine in the glass industry -- were revolutionary in scope and were responsible for abrupt and large displacements of workers.

The Tire Industry, however, offers an instance in which the increased productivity of labor was due more to the so-called evolutionary small changes in production than to any large revolutionary change in the process of tire manufacturing. Essentially there has been but one major change in the manufacture of pneumatic tires, and that occurred when the core process of tire building gave place to the flat-drum process. In some plants this occurred as early as 1919. By 1927 practically all of the major plants in the Industry had already adopted the drum process. But the increase in the man-hour output did not cease in 1927. On the contrary, since 1927, and especially in 1931, there has been an increase in man-hour productivity larger than during any preceding year in the history of tire building.

Chapter III

MATERIALS - RAW AND SEMI-PROCESSED

Quantity and Cost of Materials Consumed

The Census report on the rubber industries as a whole for 1929 contains certain detailed information on materials used, but the same information was not called for in 1931 nor in 1933. As officially reported, the "cost of materials" includes the cost of materials, containers for products, and fuel and purchased electric energy, which for the rubber industries (including tires manufacturing and other branches) was as shown in Table XVI for the year 1929.

TABLE XXI

Quantity and Cost of Materials Used in Rubber Industry, 1929

Material	Unit	Quantity	Value
Crude Rubber	Long tons	462,101	\$209,458,746
Reclaimed Rubber	Long tons	206,091	26,864,425
Carbon Black	Pounds	168,888,558	13,135,352
Zinc Oxide	Pounds	133,675,413	9,148,622
Sulphur	Pounds	61,296,703	1,354,150
Tire Fabrics	Pounds	280,057,041	126,522,448
Hose and Belting Ducks	Pounds	34,335,673	12,503,375
Other Cotton Fabrics	Pounds	70,153,962	28,450,536
Other Fabrics	Pounds	9,025,990	5,816,904
Other Fabrics	----	-----	120,281,970
Other materials	----	-----	-----
Fuel and Purchased Electric Energy	----	-----	19,677,375
Total			\$578,377,681

Source: Bureau of Foreign and Domestic Commerce, "Rubber Industry Letter No. 6," (August 29, 1933) as compiled from Census data.

Percentage Distribution of Costs

The percentage distribution of costs in the Tire Manufacturing Industry for the years 1927 to 1931 is shown in Table XXII. This table shows striking differences in the relative importance of total cost of materials for different years. Materials, in 1929, constituted the larger part of total costs but, in 1931, salaries, wages, and other "added" costs constituted the larger part.

Rubber and cotton are the materials of outstanding importance, and it will be noted that in 1931 the cost of cotton and other fabrics outranked that of crude rubber.



TABLE XXII

Percentage Distribution of Costs

Item	1927	1929	1931
Rubber	30.68%	23.45%	14.75%
Reclaim	2.29	2.16	1.73
Fabrics	12.16	18.63	15.40
Fuel and Power	1.27	1.34	1.72
Other Materials	<u>11.00</u>	<u>10.21</u>	<u>9.13</u>
Total Materials	57.40	55.79	42.73
Salaries	4.65	4.04	5.41
Wages	13.81	16.50	15.53
Other "Added"	<u>24.14</u>	<u>23.67</u>	<u>36.33</u>
Total Value Added	42.60	44.21	57.27
Total Value of Product	100.00	100.00	100.00

Source: Bureau of Foreign and Domestic Commerce, "Rubber Industry Letter No. 12." (December 5, 1933).

Chapter IV

PRODUCTION AND DISTRIBUTION

Value of Production by Principal States

The value of production, by principal states, is shown in Table XXIII for the years 1929 and 1933. The Industry is largely centered in Ohio, which produced 65 per cent of the total value of tires manufactured in 1929, and 63 per cent in 1933. The next most important state for which separate data are available was California, which produced about 7 per cent of the total in each of the years shown.

TABLE XXIII

Value of Production by Principal States, 1929 and 1933

State	1929		1933	
	Value (000's)	Per Cent of Total	Value (000's)	Per Cent of Total
California	\$56,288	7.3	\$20,979	7.0
Iowa	1,383	.2	--- a/	-- a/
New Jersey	11,586	1.5	--- a/	-- a/
Ohio	503,197	65.3	188,617	63.0
Pennsylvania	13,491	1.7	--- a/	-- a/
Wisconsin	41,244	5.3	--- a/	-- a/
All Others	143,287	18.7	89,718	30.0
Total	770,176	100.0	299,313	100.0

Source: Census of Manufactures, 1929 and 1933, "Rubber Products," Rubber Tire and Inner Tube Industry.

a/ Included in "All Others."

Interstate Commerce

With some slight qualifications, Table XXIV demonstrates the interstate character of the Industry. The data show that in 1929 the six states which produced 81 per cent of all tires and tubes consumed only 28 per cent, while the remaining states, which produced only 19 per cent, consumed 72 per cent. It must be noted that the sales data pertain only to sales of leading manufacturers; but these may be assumed to be fairly representative of sales of all manufacturers. In addition, no allowance has been made for exports, but they constituted less than 6 per cent of total production in 1929, and furthermore, most of the exports -- if not all -- must also enter into interstate commerce. 1/

1/ See Appendix Exhibit B for table giving Net Sales of Leading Manufacturers of Tires, Tubes, Solids and Accessories, by States, 1929 and 1934.

TABLE XXIV

Production and Sales of Tires and Tubes by Selected States, as Per Cent of Total Value, 1929

State	Production <u>a/</u>	Sales <u>b/</u>
Total	100.0	100.0
California	7.3	7.6
Iowa	0.2	2.1
New Jersey	1.5	2.9
Ohio	65.3	6.2
Pennsylvania	1.7	7.0
Wisconsin	5.3	2.5
Total, 6 States	81.3	28.3
Total, All Others	18.7	71.7

Source: As indicated in footnotes.

a/ Table XXIII, above.

b/ Rubber Manufacturers' Association, confidential bulletins issued April 12, 1930, and April 5, 1935. Sales are as reported by leading tire manufacturers.

Estimated Capacity

The determination of the productive capacity of an industry is usually difficult. Plant capacity is seldom static since improvements in processes tend steadily to increase it. Conversely, an increasing variety of products may restrict capacity.

The NRA, Research and Planning Division, estimated the normal capacity of the Tire Industry as of January 1, 1933, at approximately 98,500,000 tires per year. 1/ This estimate was based on 281 days' operation per year with production at the rate of 350,000 tires per day.

The former Code Authority for the Industry, in its letter to Deputy Administrator E. D. Bransome of August 1, 1934, estimated the annual capacity at 82,026,000 tires. This estimate was based on an hourly production of 13,671 tires and a year of 250 days of operation. The Code Authority stated, however, that this was an unusually conservative figure, and the difference between the two estimates is not very great -- less than 1,000 tires per hour.

1/ See NRA, Research and Planning Division, "Material Bearing on the Rubber Tire Industry," by A. L. Kress (November 9, 1933).

Estimated Over-Capacity

The excess capacity of the Tire Industry is universally regarded as a major factor in the destructive competition which characterized the Industry even before the depression began.

Before conclusions can be reached as to the extent of over-capacity, seasonal variations in production must be considered. Assuming a maximum annual demand in the future approximately equal to the 1929 production -- or 69,000,000 tires -- the average monthly production would be 5,750,000 tires.

Table XXV gives estimated actual monthly production required, after making allowance for the usual seasonal variations, to meet this demand. Production would vary from 4,870,000 tires in November to 6,613,000 in April, or 36 per cent. The April production is at the rate of approximately 80,000,000 tires per year. Assuming that the index is typical for all producers and that the variations cannot be smoothed out by building up inventories for spring demand, the Industry must have a capacity of 80,000,000 tires to meet an annual demand of 69,000,000 tires.

According to the estimate of present capacity as made by NRA, and assuming production equal to that in 1929, the Industry now has an excess capacity of 18,500,000 tires, or 23 per cent over and above the capacity requirements of 80,000,000 tires for the seasonal peak. It is not believed furthermore, that demand will exceed 70,000,000 tires over the next five years.

1/

TABLE XXV

Seasonal Variation in Tire Production, and Monthly Output
Required for Annual Production of 69,000,000 Tires

Month	Seasonal Index	Monthly Output (1,000 Tires)
January	95.3	5,479
February	99.2	5,704
March	110.8	6,371
April	115.0	6,613
May	111.8	6,428
June	113.0	6,498
July	96.0	5,520
August	103.0	5,922
September	94.0	5,405
October	89.3	5,135
November	84.7	4,870
December	87.9	5,054

Source: NRA, Research and Planning Division. Constructed from monthly tire production reported by the Rubber Manufacturers' Association for 1923 to 1931. For details as to method, see NRA, Research and Planning Division, "Material Bearing on the Rubber Tire Industry," by A. L. Kress (November 9, 1933)

1/ Based on consideration of such factors as increased mileage of tires, increased use of retreaded tires, and decrease in production of automobiles.

Chapter V

FOREIGN TRADE

Position of United States in Exporting Trade

As shown in Table XXVI the United States ranked first among countries exporting pneumatic automobile casings in 1929. In that year the United States exported 31 per cent of total world exports. Our nearest competitor was Canada, with exports totaling 19 per cent of world trade.

In 1933 the United States exported only 22 per cent of total world exports and ranked second in importance. By this year first place was yielded by the United Kingdom which in 1933 exported 28 per cent of total world exports. The rise of the United Kingdom was due to several factors, among which may be mentioned; (1) the establishment of branch factories of American companies in the United Kingdom, which shifted American business to that country; (2) the tariff policies of the British Empire; (3) England's suspension of the gold standard; and, (4) American adherence to the gold standard.

Table XXVI shows the percentage of world exports shipped by the leading countries and their rank in importance for the years 1929 and 1933.

TABLE XXVI

Percentage Distribution of World Exports among
Exporting Countries, 1929 and 1933

Country	Percentage of Total World Shipments			
	1929		1933	
	Percentage	Rank	Percentage	Rank
United States	31.4	1	22.0	2
Canada	18.6	2	8.6	6
United Kingdom	13.7	4	28.2	1
France	15.8	3	13.9	3
Italy	9.2	5	10.6	5
Germany	3.2	7	2.3	8
Belgium	7.2	6	10.7	4
Japan	.9	8	3.7	7
Total	100.0		100.0	

Source: Bureau of Foreign and Domestic Commerce, "Rubber Industry Letter No. 16" (October 15, 1934).

Table XXVII shows the total annual world shipments of automobile casings during the decade 1924-1933, and the United States' share in each year. It will be seen that international shipments reached their peak in 1929. Since 1929 there has been a continued drop in the shipments -- with the exception of 1933 which showed a slight increase over 1932 -- due in part to the world-wide

depression; and in part to the building of branch factories in foreign countries thus tending to make each country self-sufficient and to decrease world trade. The United States' percentage of the total has fluctuated irregularly; it declined from 1930 to 1932, but showed some improvement in 1933.

TABLE XXVII

U. S. Exports and Total World Exports of Automobile Casings, 1924-1933
(Unit = thousand casings)

Year	Exports from United States <u>a/</u>	Total World Exports <u>b/</u>	Percentage U.S. Exports are of Total
1924	1,250	5,098	24.5
1925	1,475	6,630	22.2
1926	1,497	6,627	22.6
1927	2,630	8,752	30.0
1928	2,504	8,632	29.0
1929	2,796	9,383	29.8
1930	2,504	8,232	30.4
1931	1,771	6,215	28.5
1932	908	5,151	17.6
1933	1,058	5,625	18.8

Source: As indicated in footnotes.

a/ Bureau of Foreign and Domestic Commerce, Foreign Commerce and Navigation, of the United States, 1924-1933.

b/ Bureau of Foreign and Domestic Commerce, "Rubber Industry Letter No. 16" (October 15, 1934).

Volume of Exports

In 1929 the United States exported 2,796,000 pneumatic automobile casings, but in 1933 exports amounted to only 1,058,000 casings, a decrease of 1,738,000 casings, or 62 per cent.

The exports of tubes decreased from 1,899,000 tubes in 1929 to 664,000 tubes in 1933, a decrease of 1,235,000 tubes, or 65 per cent. Exports of solid tires decreased from 45,000 tires in 1929 to 7,000 tires in 1933, a decrease of 85 per cent.

Table XXVIII shows the volume and value of exports of rubber tires and tubes for 1929 and 1933, and also shows the changes in volume and value for the two years.

Value of Exports

The total value of exports declined from \$39,079,000 in 1929 to \$10,071,000 in 1933, a decrease of \$29,008,000, or 74 per cent. For all groups, the decrease in value was greater than the decrease in volume due to lower unit values.

TABLE XXVIII

Volume and Value of United States Exports of Rubber Tires,
by Principal Product Groups, 1929 and 1933
(In thousands)

Product Group	1929		1933		Percentage decrease	
	Volume	Value	Volume	Value	Volume	Value
Total	--	\$39,079	--	\$10,071	--	74.2
Casings - Total	2,796	33,480	1,058	9,010	62.2	73.1
Truck and Bus	287	7,555	211	3,323	26.5	56.1
Other Auto Casings	2,509	25,924	847	5,693	66.3	78.1
Tubes - Auto	1,899	3,410	664	692	65.0	79.6
Other Casings and Tubes	200	591	26	58	87.0	90.2
Solid Tires						
Auto and Trucks	45	1,301	7	183	84.5	86.0
Others (lbs.)	1,639	297	1,113	122	32.1	59.0

Source: Bureau of Foreign and Domestic Commerce, Foreign Commerce and Navigation of the United States, 1929 and 1933.

Exportation of Capital and Labor by the Industry

Within the past few years, the Tire Manufacturing Industry has witnessed a change in the nature of its exports; that is, instead of exporting tires, the Industry has exported capital and skilled labor to build branch factories in foreign countries. Complete data as to the number of foreign factory branches are not available, but the following branches are known:



TABLE XXIX

Location of Foreign Branch Factories of Leading
Companies in the Industry

Company	Country in which Factory is Located
Firestone	Argentina, Canada, England, Spain
General	Mexico <u>a/</u>
Goodrich	Canada, France, Japan
Goodyear	Argentina, Australia, Canada, England, Java
India	Scotland <u>a/</u>
United States	Canada

Source: Opinion of G. S. Earseman, Assistant Deputy Administrator, NRA,
September, 1935.

a/ License agreement only.

The building of a branch in a foreign country means not only the loss of that country as a market for American-manufactured tires, but is also likely to involve a serious competition for American tires in that country. For example, when the Firestone and Goodyear Companies established factories in Argentina, tariffs were immediately imposed by Argentina upon all imported tires, thus closing that market to American tires. Furthermore neighboring South American countries can be more efficiently supplied from the Argentina factory than they can from the Akron, Ohio, factory.

Another consideration is that the foreign branch factories have only recently been built and they represent the most modern developments in factory equipment and design. This, together with their lower priced labor, makes them serious competitors of the American Industry.

There are some authorities who believe it is only a matter of a short time before foreign-built tires invade our domestic markets.

U. S. Imports

Imports of pneumatic automobile casings into the United States are of negligible importance. During the period 1923 through 1933, our imports were always less than one-half of one per cent of our domestic production.

The largest imports occurred in 1924 when 183,586 casings were imported. Such large importations are out of proportion to previous and subsequent years, and the explanation is not known. From 1924 through 1928, imports declined to 4,469 casings, or less than .01 per cent of domestic production. Since 1928, imports have gradually increased and, in 1932, 25,472 casings were imported. This was the equivalent of about .06 per cent of domestic production.

The reason advanced as to why the United States has any imports at all is the fact that the branch factories in Canada manufacture certain sizes and types of tires not produced in this country.

Table XXX shows United States imports of pneumatic casings for the period 1923 through 1933, and the percentage of imports to domestic production.

TABLE XXX

Imports of Pneumatic Automobile Casings,
and Percentage Imports were of Domestic Production, 1923-1933

Year	Imports	Domestic Production	Percentage Imports are of Domestic Production
1923	9,179	45,425,591	0.02
1924	183,586	50,620,000	0.36
1925	21,139	53,734,073	0.04
1926	17,504	60,120,000	0.03
1927	5,450	63,549,949	0.01
1928	4,469	75,527,000	0.01
1929	5,540	69,765,223	0.01
1930	7,782	51,610,000	0.02
1931	13,213	49,142,622	0.03
1932	25,472	40,085,000	0.06
1933	22,000 _{a/}	43,000,000 _{a/}	0.05 _{a/}

Source: Bureau of Foreign and Domestic Commerce, "Rubber Industry Letter No. 11" (December 1, 1933).

_{a/} Preliminary

APPENDIX

Exhibit A

Statistical Summary of the Industry, 1921, 1929, 1931, and 1933

Item	1921	1929	1931	1933
Number of establishments	178	91	54	44
Number of wage earners	55,496	83,263	48,341	52,976
Average per establishment	312	915	895	1,204
Amount paid in wages	\$75,054,000	\$127,082,000	\$62,385,000	\$54,737,000
Average per worker	\$1,352	\$1,526	\$1,290	\$1,033
Number of tires produced				
Casings	27,298,000	69,765,000	48,989,000	45,376,000
Solid tires	401,000	424,000	103,000	85,000
Average per establishment	155,600	771,300	943,000	1,033,205
Average per worker	499.1	843.0	1,015.5	858.1
Number of inner tubes produced	32,082,000	74,043,000	47,726,000	49,167,000
Value of tires and tubes	\$496,123,000	\$676,364,000	\$352,924,000	\$299,313,000
Average per article	\$17.91	\$9.63	\$7.19	\$6.09
Value added by manufacture	\$204,569,000	\$340,570,000	\$221,036,000	\$159,921,000
Average per worker	\$3,686	\$4,090	\$4,574	\$3,019
Per cent wages are of value added per worker	36.68	37.31	28.20	34.22

Source: 1933 data from Census of Manufactures, "Rubber Products", Rubber Tire and Inner Tube Industry; the remainder from Bureau of Labor Statistics, Labor Productivity in the Automobile Tire Industry, by Louis Stern (Bulletin No. 565, July, 1933).

APPENDIX

Exhibit B

Net Sales of Leading Manufacturers of Tires,
Tubes, Solids and Accessories, by States, 1929 and 1934

State	1929		1934		Per Cent Change, 1929 to 1934	
	Amount (000's)	Per Cent of Total	Amount (000's)	Per Cent of Total		
ALABAMA	\$ 4,730	1.35	\$ 2,687	1.38	-43.2	+ 2.2
ARIZONA	2,060	.59	1,090	.56	-47.1	- 5.1
ARKANSAS	3,825	1.10	1,803	.93	-52.9	- 15.5
CALIFORNIA	26,686	7.65	16,688	8.57	-37.5	+ 12.0
COLORADO	3,215	.92	1,947	1.0	-39.4	+ 8.7
CONNECTICUT	5,423	1.56	2,917	1.50	-46.2	- 3.8
DELAWARE	784	.22	524	.27	-33.2	+ 22.7
D. C.	1,925	.55	1,319	.68	-31.5	+ 25.6
FLORIDA	6,099	1.75	4,207	2.16	-31.0	+ 23.4
GEORGIA	5,430	1.56	3,918	2.01	-27.8	+ 28.8
IDAHO	1,278	.37	920	.47	-28.0	+ 27.0
ILLINOIS	19,728	5.66	9,924	5.10	-49.7	- 9.9
INDIANA	10,362	2.97	5,308	2.73	-48.8	- 8.1
IOWA	7,400	2.12	3,691	1.89	-50.1	- 10.9
KANSAS	6,754	1.94	3,574	1.84	-47.1	- 5.2
KENTUCKY	4,268	1.22	2,630	1.35	-38.4	+ 10.7
LOUISIANA	5,719	1.64	2,742	1.41	-52.1	- 14.0
MAINE	2,114	.61	1,336	.69	-36.8	+ 13.1
MARYLAND	3,835	1.10	2,553	1.31	-33.4	+ 19.1
MASSACHUSETTS	12,303	3.53	6,318	3.25	-48.6	- 7.9
MICHIGAN	14,139	4.06	7,396	3.80	-47.7	- 6.4
MINNESOTA	7,341	2.11	3,809	1.96	-48.1	- 7.1
MISSISSIPPI	3,909	1.12	1,761	.90	-55.0	- 19.6
MISSOURI	10,731	3.08	5,930	3.05	-44.7	- 1.0
MONTANA	1,783	.51	1,255	.64	-29.6	+ 25.5
NEBRASKA	4,559	1.31	2,475	1.27	-45.7	- 3.1
NEVADA	566	.16	434	.22	-23.5	+ 37.5
NEW HAMPSHIRE	1,329	.38	767	.39	-42.3	+ 2.6
NEW JERSEY	10,237	2.94	5,619	2.89	-45.1	- 1.7
NEW MEXICO	1,038	.30	786	.40	-24.3	+ 33.3
NEW YORK	32,530	9.33	16,732	8.60	-48.6	- 7.8
N. CAROLINA	7,080	2.03	4,418	2.27	-37.6	+ 11.8
N. DAKOTA	1,631	.47	625	.32	-61.7	- 31.9
OHIO	21,616	6.20	11,560	5.94	-46.5	- 4.2

(Continued)

Exhibit B (Concluded)

State	1929		1934		Per Cent Change, 1929 to 1934	
	Amount (000's)	Per Cent of Total	Amount (000's)	Per Cent of Total		
OKLAHOMA	\$ 7,986	2.29	\$ 4,158	2.14	-47.9	- 6.6
OREGON	3,639	1.04	2,525	1.30	-30.6	+25.0
PENNSYLVANIA	24,264	6.96	14,346	7.37	-40.9	+ 5.9
RHODE I.	2,177	.62	1,101	.57	-49.4	- 8.1
S. CAROLINA	2,774	.80	1,844	.95	-33.5	+18.8
S. DAKOTA	2,285	.66	814	.42	-64.4	-36.4
TENNESSEE	5,925	1.70	3,626	1.86	-38.8	+ 9.4
TEXAS	20,669	5.93	11,770	6.05	-43.1	+ 2.0
UTAH	1,996	.57	1,157	.59	-42.0	+ 3.5
VERMONT	1,140	.33	549	.28	-51.8	-15.2
VIRGINIA	4,795	1.38	3,267	1.68	-31.9	+21.7
WASHINGTON	5,287	1.52	3,700	1.90	-30.0	+25.0
WEST VIRGINIA	3,598	1.03	1,943	1.00	-46.0	- 2.9
WISCONSIN	8,729	2.50	3,725	1.91	-57.3	-23.6
WYOMING	924	.27	452	.23	-51.1	-14.8
Total	\$348,615	100.00	\$194,640	100.00	-44.2	

Source: Rubber Manufacturers' Association, confidential bulletins issued April 12, 1930, and April 5, 1935.

